

## **REMARKS**

These remarks are responsive to the non-final Office action dated August 2, 2006, and are being filed under 37 C.F.R. § 1.111. Claims 1-33 are pending in the application. In the Office action, the Examiner rejected each of the pending claims as follows:

- Claims 1-17 and 20-33 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,048,344 to Schenk ("Schenk"); and
- Claims 18 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schenk alone (claim 19) or over a combination of Schenk and U.S. Patent No. 5,470,334 to Ross et al. ("Ross") (claim 18).

Applicants traverse the rejections, contending that all of the claims are patentable over the cited references. Nevertheless, to expedite the issuance of a patent, and to more particularly point out and distinctly claim aspects of the invention that applicants want to patent now, applicants have (1) canceled claims 1-4, 10, 12, and 16, without prejudice; (2) amended claims 5, 9, 11, 13-15, 21, 22, 24, and 26-30; and (3) added new claims 34-40. However, applicants reserve the right to pursue the canceled claims and the subject matter of the original form of the amended claims at a later time. Furthermore, applicants have presented remarks showing that all of the pending claims are patentable over the cited references. Accordingly, applicants respectfully request reconsideration of the application in view of the amendments above and the remarks below, and prompt issuance of a Notice of Allowability covering all of the pending claims.

### ***I. Amendments to the Claims***

The present communication amends claims 5, 9, 11, 13-15, 21, 22, 24, and 26-30, and adds seven new claims, namely, claims 34-40. The amendments to the original claims

and the new claims are supported fully by the application. Exemplary support (or an explanation) for each claim amendment and new claim is included, without limitation, in the following table:

<b>Claim</b>	<b>Exemplary Support (or Explanation)</b>
5 (Independent)	Page 4, lines 18-21; page 7, lines 11-15; page 10, lines 7-17; page 11, lines 4-6; Figures 1, 3, 6, and 7
9	(reworded to improve clarity)
11	(reworded to improve clarity and amended to change dependency)
13	(reworded to improve clarity)
14	(addresses a formal issue created by amendment of claim 5)
15	(reworded to improve clarity)
21	(amended to correct a typographical error)
22	(reworded to improve clarity)
24	(reworded to improve clarity)
26	(amended to improve clarity by defining "axial length" more explicitly)
27	(amended to improve clarity by defining "axial length" more explicitly)
28 (Independent)	Page 4, lines 2 and 3; page 15, lines 2 and 3; claim 16; Figure 2
29	(addresses a formal issue created by amendment of claim 28)
30	(addresses a formal issue created by amendment of claim 28)
34	Figure 4; page 10, lines 7-17
35 (Independent)	Claim 1; page 4, lines 18-21; page 5, lines 9 and 10; page 7, lines 11-15; page 10, lines 7-17; page 11, lines 4-6; Figures 1, 3, 6, and 7
36	Figures 3, 6, and 7
37	Page 11, lines 4 and 5
38	Page 10, line 23, to page 11, line 1
39	Figure 4; page 10, lines 12-16
40	Page 11, lines 9 and 10; Figure 3

**II. Claim Rejections – 35 U.S.C. §§ 102 and 103**

The Examiner rejected each of the pending claims as being anticipated or obvious. Claims 1-17 and 20-33 were rejected under 35 U.S.C. § 102(b) as being anticipated by Schenk. In addition, claims 18 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schenk alone (claim 19) or Schenk in combination with Ross (claim 18). Applicants traverse the rejections, contending that the cited references, taken alone or in combination, do not teach or suggest every element of any of the rejected claims. Nevertheless, for the reasons set forth above, applicants have (1) canceled claims 1-4, 10, 12, and 16, without prejudice; and (2) amended claims 5, 9, 11, 13-15, 22, 24, and 26-30. Each of claims 5-9, 11, 13-15, and 17-33 is patentable for at least the reasons set forth below.

**A. Claims 5-9, 11, 13-15, and 17-20**

Independent claim 5 is directed to a bone screw for compression of a bone:

5. (Currently Amended) A bone screw for compression of a bone, comprising:

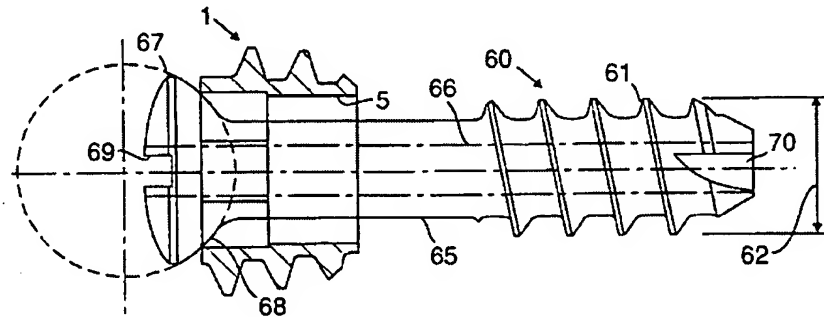
a shank including a thread **and defining a long axis and a direction of advancement into bone**; and

a head connected to the shank and ~~including a lateral surface~~ defining a plurality of ledge structures **disposed at spaced positions along the head, each ledge structure facing generally toward the direction of advancement and extending partially or completely around the head to define a respective plane disposed orthogonally to the long axis** ~~disposed circumferentially on the head.~~

In the Office action, claim 5 was rejected as being anticipated by Schenk. However, Schenk does not teach or suggest every element of amended claim 5. For example, Schenk does not teach or suggest a head “defining a plurality of ledge structures,” with

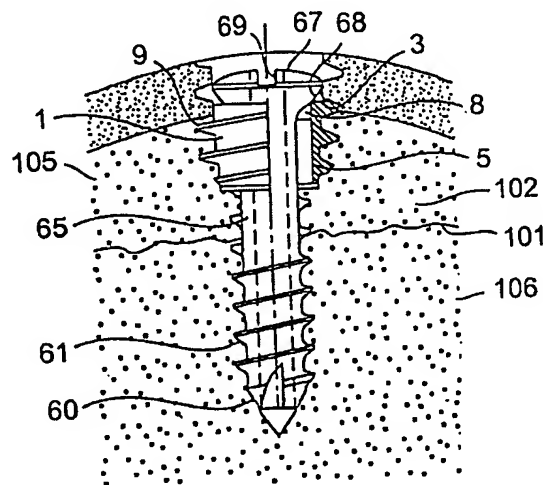
“each ledge structure facing generally toward the direction of advancement and extending partially or completely around the head to define a respective plane disposed orthogonally to the long axis.”

Schenk relates to a threaded washer and bone screw apparatus. Figure 4 illustrates an example of the apparatus and is reproduced here to facilitate review:



**FIG. 4**

The apparatus is disclosed to include a cannulated screw 60 and a threaded washer 1 with a central unthreaded bore 5 that receives the cannulated screw. Figure 8 of Schenk illustrates the apparatus installed in bone and is reproduced here to facilitate review:



**FIG. 8**

Threaded washer 1 has an external thread 9 that allows the threaded washer to be driven rotationally into bone. Thread 9 winds around and along the exterior of the cylindrical body of the threaded washer, to follow a helical path that is inherently nonplanar and noncircular. Thread 9 thus does not extend “partially or completely around the head to define a respective plane,” as recited in part by amended claim 5. Furthermore, even if thread 9 were to be construed as defining a plane, although applicants contend that it does not, the plane would be disposed obliquely to the long axis defined by the shank and not “orthogonally to the long axis,” as recited in part by amended claim 5. Accordingly, claim 5 should be allowed. In addition, claims 6-9, 11, 13-15, and 17-20, which depend from claim 5, also should be allowed for at least the same reasons as claim 5.

**B. Claims 21-26**

Independent claim 21 is directed to a bone screw for compression of a bone:

21. (Currently Amended) A bone screw for compression of a bone, comprising:

a shank including a proximal region, a distal region, and a thread restricted to the distal region; and

a head connected to the shank and spaced from the thread by the proximal region, the head including a lateral surface defining a plurality of spaced ledge structures disposed on the head, each ledge structure describing at least a portion of a circle.

In the Office action, claim 21 was rejected as being anticipated by Schenk. However, Schenk does not teach or suggest every element of claim 21. For example, Schenk does not teach or suggest “each ledge structure describing at least a portion of a circle.” In particular, as described above in relation to claim 5, the thread disclosed by Schenk

follows a helical path, which always extends in three dimensions, and thus never describes a portion of a circle, which is a two-dimensional curve. Claim 21 thus should be allowed. In addition, claims 22-26, which depend from claim 21, also should be allowed for at least the same reasons as claim 21.

C. Claim 27

Independent claim 27 is directed to a bone screw for compression of a bone:

27. (Currently Amended) A bone screw for compression of a bone, comprising:

a shank including a thread **and defining a long axis**; and

a head connected rotatably to the shank and configured to follow the shank into the bone, the head having an aspect ratio defined by its axial length relative to its maximum diameter, the aspect ratio being at least 1:1,

**wherein the axial length is measured parallel to the long axis.**

In the Office action, claim 27 was rejected as being anticipated by Schenk. However, Schenk does not teach or suggest every element of claim 27. For example, Schenk does not teach or suggest a bone screw with a “head having an aspect ratio defined by its axial length relative to its maximum diameter, the aspect ratio being at least 1:1.”

The Examiner, in rejecting claim 27, used an axial length measured diagonally in the head of Schenk’s threaded washer. Accordingly, to clarify the intended meaning of the term “axial length,” applicants have amended claim 27 to recite that “the axial length is measured parallel to the long axis” defined by the shank of the bone screw. Schenk does not teach or suggest the aspect ratio of at least 1:1 recited by claim 27. Claim 27 thus should be allowed.

*D. Claims 28-33*

Independent claim 28 is directed to a method of compressing a bone with a bone screw:

28. (Currently Amended) A method of compressing a bone with a bone screw, comprising:  
forming a hole in the bone;  
selecting a bone screw having a shank and a head; and  
advancing first the shank and then the head of the bone screw into the hole so that the head contacts and applies an axial force selectively to a plurality of spaced **annular** regions of the bone **that each define a respective plane**, such that portions of the bone near the head are compressed toward portions of the bone near the shank.

In the Office action, claim 28 was rejected as being anticipated by Schenk. However, Schenk does not teach or suggest every element of claim 28. For example, Schenk does not teach or suggest a step of advancing a head of a bone screw “so that the head contacts and applies an axial force selectively to a plurality of spaced annular regions of the bone that each define a respective plane.” Instead, the helical thread of Schenk's washer would engage a helical region of bone, which does not define a plane. Claim 28 thus should be allowed. In addition, claims 29-33, which depend from claim 28, also should be allowed for at least the same reasons as claim 28.

*III. New Claims 34-40*

The present communication adds seven new claims, namely, dependent claim 34, which depends from allowable claim 5, independent claim 35, and dependent claims 36-40, which depend from claim 35. Each of the new claims is fully supported by the application as detailed above in Section I.

Independent claim 35 is directed to a bone screw for compression of a bone:

35. (New) A bone screw for compression of a bone, comprising:  
a shank including a thread and defining a long axis and a direction of advancement into bone; and  
a head connected to the shank and including a plurality of spaced shoulders of different diameter, each shoulder facing generally in the direction of advancement and extending partially or completely around the long axis in a respective path defining a plane.

Claim 35 is patentable over the cited references because neither reference, taken alone or in combination, teaches or suggests every element of claim 35. For example, neither reference teaches or suggests a head “including a plurality of spaced shoulders of different diameter,” with each shoulder “extending partially or completely around the long axis in a respective path defining a plane.” In particular, each of the cited references discloses a thread extending in a nonplanar (helical) path. Accordingly, claim 35 should be allowed. Claims 36-40, which depend from claim 35, also should be allowed for at least the same reasons as claim 35.

#### **IV. Conclusion**

Applicants believe that each of the pending claims is patentable over the cited references. Accordingly, applicants respectfully request that the Examiner issue a Notice of Allowability covering all of the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the



application, please contact the undersigned attorney of record, or his associate Stan Hollenberg (Reg. No. 47,658), both at 503-224-6655.

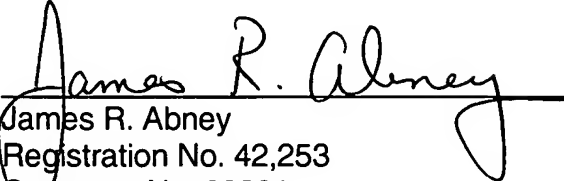
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